

CLAIMS

What is claimed is:

1. A method for improving a downlink signal received by a listener on a phone, comprising:
 - calculating an environment noise level of the listener; and
 - filtering and adjusting gain of the downlink signal based on the environment noise level.
2. The method of Claim 1, wherein calculating the environment noise level comprises taking a slow moving average of a noise level of the listener's uplink signal.
3. The method of Claim 1, wherein calculating the environment noise level comprises taking a long time average of a noise level of the listener's uplink signal.
4. The method of Claim 1, wherein calculating the environment noise level comprises employing a signal averaging technique to determine an average of a noise level of the listener's uplink signal.
5. The method of Claim 1, wherein filtering the downlink signal comprises subtracting low frequency energy from the downlink signal.
6. The method of Claim 1, wherein filtering the downlink signal comprises adding high frequency energy to the downlink signal.
7. A method for improving a downlink signal received by a listener on a phone, comprising:
 - calculating an environment noise level of the listener;
 - delaying the downlink signal if the environment noise level is less than a first threshold; and
 - filtering and adjusting gain of the downlink signal if the environment noise level is higher than a second threshold.
8. The method of Claim 7, further comprising:
 - delaying and adjusting gain of the downlink signal to create a delayed signal, if the environment noise level is greater than or equal to the first threshold and less than or equal to the second threshold;
 - filtering and adjusting gain of the downlink signal to create a filtered signal, if the environment noise level is greater than or equal to the first threshold and less than or equal to the second threshold; and

adding the delayed signal and the filtered signal if the environment noise level is greater than or equal to the first threshold and less than or equal to the second threshold.

9. The method of Claim 7, wherein calculating the environment noise level comprises taking a slow moving average of a noise level of the listener's uplink signal.

10. The method of Claim 7, wherein calculating the environment noise level comprises taking a long time average of a noise level of the listener's uplink signal.

11. The method of Claim 7, wherein calculating the environment noise level comprises employing a signal averaging technique to determine an average of a noise level of the listener's uplink signal.

12. The method of Claim 7, wherein filtering the downlink signal comprises subtracting low frequency energy from the downlink signal.

13. The method of Claim 7, wherein filtering the downlink signal comprises adding high frequency energy to the downlink signal.

14. An apparatus for improving a downlink signal received by a listener on a phone, comprising:

a noise level calculator that calculates an environment noise level of the listener;

a filter that creates a filtered downlink signal; and

a gain controller, coupled to the filter and the noise level calculator, that receives the filtered downlink signal and adjusts gain of the filtered downlink signal based on the environment noise level.

15. The apparatus of Claim 14, further comprising:

a delay line, coupled to the gain controller, that creates a delayed downlink signal, wherein the gain controller receives the delayed downlink signal and adjusts gain of the delayed downlink signal based on the environment noise level; and

an adder coupled to the gain controller that adds the delayed downlink signal and the filtered downlink signal.

16. The apparatus of Claim 14, wherein the filter is a high pass filter.

17. The apparatus of Claim 14, wherein the filter is an FIR filter.

18. The apparatus of Claim 14, wherein the filter is an IIR filter.

19. The method of Claim 14, wherein the filter comprises an adder that adds high frequency energy to the downlink signal.

20. The method of Claim 14, wherein the filter comprises a subtractor that subtracts low frequency energy from the downlink signal.